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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/688,465	10/16/2000	Bernhard Schatzler	GR 97 P 1049 D	1415

7590 12/04/2003
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EXAMINER

PAREKH, NITIN

ART UNIT PAPER NUMBER

2811

DATE MAILED: 12/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/688,465

Applicant(s)

SCHATZLER ET AL.

Examiner

Nitin Parekh

Art Unit

2811

AW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/14/03 has been entered. An action on the RCE follows.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hara (US Pat. 5498902) in view of Inaba (US Pat. 4258381).

Regarding claim 1, Hara discloses an electronic component comprising:

- a flat pack/FP (6 in Fig. 11)
- a housing made of a casting/plastic molding/encapsulant (6 in Fig. 11)

- a lead frame (2/3/5 in Fig. 11) having an island/die pad with a continuous/unpatterned base area (2 in Fig. 11) supporting an integrated circuit (IC)/die (106 in Fig. 11)
- the IC/semiconductor element (1 in Fig. 11) being conventionally bonded/adhesively mounted (bonding adhesive not numerically referenced in Fig. 11; Col. 1, line 23) to the island/die pad, the base area of the IC being smaller than that of the island/die pad, and
- the IC/die and the island/die pad being embedded in the housing so that a thickness of the housing region above the IC is substantially equal to that below the island/die pad (see Fig. 11)

(Fig. 11; Col. 1, lines 20-35).

Hara further teaches the outer leads extending in four directions such that the leads can have different orientation and shapes such as quad flat pack (QFP), plastic leaded chip carrier (PLCC), etc. (Col. 11, lines 43-54) and the packages being made thin and small to achieve the desired yield, function and application requirements (Col. 12, lines 12-40).

Hara fails to teach the ratio between the base area of the IC and that of the island being 0.7- 0.9 for avoiding the flexure of the housing.

Inaba teaches using a lead frame package comprising an IC and an island, the island having a square shape (Fig. 1; Col. 4) and using a range of island dimensions to support various chip sizes (Col. 2, line 55). Inaba further teaches selecting the dimensions of the island depending on the size of the IC and selecting the respective area ratio by selecting the dimensions of the recesses around periphery of the island (recesses not numerically referenced in Fig. 4 and 7; Col. 2, lines 10-22; Col. 5, lines 5-25 and 40-54; Col. 4, lines 12-19) to achieve an optimized bonding between the IC and the island, heat dissipation and reduced heat stress/defects (Col. 2, line 55; Col. 5, line 1-25). Such configuration of different area ratios includes an area ratio between the IC and the island being around 0.973 (Fig. 4; Col. 4, line 45-58; also see remarks on page 4 in applicant's response in paper #8).

Furthermore, the determination/selection of the parameters such as the dimensions of the IC chip and die pad/island including width, thickness, shape, area/area ratio, clearance of the die from an edge of the die pad/leads, etc. is a matter of routine experimentation and optimization to achieve the desired support/rigidity and reduced level of heat stress and the corresponding thermal and encapsulation defects such as a warpage/flexure and cracking of the plastic molding/housing.

It would have been obvious to a person of ordinary skill in the art at the time invention was made to arrive at a ratio between the base area of the IC and that of the island of 0.7- 0.9 for avoiding the flexure of the housing as taught by Inaba so that the

thermal stress and the overall size/weight of the package can be reduced and a variety of die sizes can be accommodated in Hara's electronic component.

Regarding claim 3, Hara and Inaba teach substantially the entire claimed structure as applied to claim 1 above, wherein Hara teaches the island/die pad (110 in Fig. 1) being a continuous/unpatterned area (see Fig. 11).

Regarding claim 4, Hara and Inaba teach substantially the entire claimed structure as applied to claim 1 above, except the leads being routed to the island.

Inaba further teaches using the lead frame packages having the leads being routed to the island/die pad (2'/1 and 7'/5 respectively in Fig. 1 and 4 respectively; Col. 2 and 3).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the leads being routed to the island as taught by Inaba so that the mechanical strength and rigidity of the island can be improved in Inaba and Hara's electronic component.

Regarding claim 5, Hara and Inaba teach substantially the entire claimed structure as applied to claim 1 above, wherein Hara teaches the lead frame including the leads being vertically centered within the housing and the island/die pad being vertically lowered with respect to the leads (see 3 and 2 respectively in Fig. 11).

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hara (US Pat. 5498902) and Inaba (US Pat. 4258381) as applied to claim 1 above, and further in view of Lim et al. (US Pat. 5773878).

Regarding claim 2, Hara and Inaba teach substantially the entire claimed structure as applied to claim 1 above, except a hollow groove formed on the IC by an amount of an adhesive emerged from between the IC and the island.

Lim et al. teach an adhesive bonding (18 in Fig. 2) of the IC to the island (Col. 2, line 9) and a hollow groove shape/fillet being formed by emerged adhesive at the notch/groove/overhang portion of the island (see a corner/edge portion between 20 and 14 in Fig. 2).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the hollow groove being formed on the IC by the amount of an adhesive emerged from between the IC and the island as taught by Lim et al. so that the die bonding can be strengthened in Inaba and Hara's electronic component.

Response to Arguments

5. Applicant's arguments with respect to claims 1-5 have been considered but are moot in view of the new ground(s) of rejection.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 703-305-3410. The examiner can normally be reached on 09:00AM-05:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 703-305-1690. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Nitin Parekh

NP
11-30-03



EDDIE LEE
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